Stream bryophytes in Victorian rainforest streams

Stream bryophytes potentially constitute a major part of the autotrophic biomass in stream ecosystems. They are generally more abundant in cool streams with a strong current as many require carbon dioxide, which is available in an adequate supply due to turbulence, for photosynthesis. Bryophyte abundance is higher in streams that have a uniform and stable substratum. On stream rocks, bryophyte species richness is variable, with areas submerged having quite low species richness. The area at and just above the water line has a sharp increase in bryophyte species richness and consists mainly of facultatively aquatic species.

Stream bryophytes are common in Victorian rainforest streams (Fig. 1), occurring on rocks, logs and sediment. However, research into stream bryophytes is limited compared to the amount of research dealing with their terrestrial counterparts. This is surprising considering their abundance and diversity, especially in

Table 1. Preliminary list of bryophyte species identified in Victorian rainforest streams.

Bryophyta

Aehrophyllum dentatum (Hook.f. & Wilson) Vitt & Crosby
Atrichum androgynum (Müll.Hal.) A.Jaeger
Camptochaete arbuscula (Sm.) Reichardt var. *arbuscula*
Catagonium nitens (Brid.) Cardot subsp.*nitens*
Cyathophorum bulbosum (Hedw.) Müll.Hal.
Dicranoloma billardieri (Brid. Ex Anon.)Paris
Dicranoloma menziesii (Taylor) Renauld var. *menziesii*
Fallaciella gracilis (Hook.f. & Wilson) H.A. Crum
Fissidens dietrichiae Müll.Hal.
Fissidens rigidulus Hook.f. & Wilson var. *rigidulus*
Fissidens taylorii Müll.Hal.
Fissidens tenellus Hook.f. & Wilson
Hypnodendron comosum (Labill.) Mitt. var. *sieberi* (Müll.Hal.) Touw
Hypnodendron spininervium (Hook.) A.Jaeger & Sauerb. subsp. *archeri* (Mitt.) Touw
Hypnodendron vitiense Mitt. subsp. *australe* Touw
Hypopterygium tamarisci (Sw.) Brid. ex Müll. Hal.
Mesochaete undulata Lindb.
Pseudoleskiopsis imbricata (Hook.f. & Wilson) Thér.
Ptychomnion aciculare (Brid.) Mitt.
Pyrrhobryum mnioides (Hook.) Manuel subsp. *contortum* (Wilson) Fife
Racopilum cuspidigerum (Schwägr.) Ångstr. var. *convolutaceum* (Müll.Hal.) Zanten & Dijkstra
Rosulabryum billardieri (Schwägr.) J.R. Spence
Sematophyllum homomallum (Hampe) Broth.
Thamnobryum pumilum (Hook.f. & Wilson) Nieuwl.
Thuidiopsis furfurosa (Hook.f. & Wilson) M.Fleisch.
Wijkia extenuata (Brid.) H.A.Crum

Hepatophyta

Aneura alterniloba (Hook.f. & Taylor) Taylor & Hook.f.
Bazzania adnexa (Lehm. & Lindenb.) Trevis.
Chiloscyphus semiteres (Lehm. & Lindenb.) Lehm. & Lindenb. var. *semiteres*
Geocalyx caledonicus Steph.
Heteroscyphus coalitus (Hook.) Schiffn.
Heteroscyphus fissistipus (Hook.f. & Taylor) Schiffn.
Heteroscyphus planiusculus (Hook.f. & Taylor) J.J.Engel
Hymenophyton flabellatum (Labill.) Dumort. ex Trevis.
Lepidozia laevifolia (Hook.f. & Taylor) Taylor ex Gottsche, Lindenb. & Nees var. *laevifolia*
Lepidozia ulothrix (Schwaegr.) Lindenb.
Lunularia cruciata (L.) Dumort.
Marchantia berteroana Lehm. & Lindenb.
Marchantia foliacea Mitt.
Metzgeria furcata (L.) Dumort.
Plagiochila fasciculata Lindenb.
Plagiochila retrospectans Nees
Plagiochila strombifolia Taylor ex Lehm.
Podomitrium phyllanthus (Hook.) Mitt.
Radula buccinifera (Hook.f. & Taylor) Taylor ex Gottsche, Lindenb. & Nees
Riccardia aequicellularis (Steph.) Hewson
Riccardia crassa (Schwaegr.) Carrington & Pearson
Schistochila lehmanniana (Lindenb.) Steph.
Symphyogyna podophylla (Thunb.) Mont. & Nees

Anthocerophyta

Megaceros gracilis (Rchdt.) Steph.

mountain streams. As part of my PhD I am looking into the ecology, reproduction and genetics of stream bryophytes in Victorian rainforest streams, encompassing Cool Temperate, Warm Temperate and Gallery Rainforest pockets. So far, a total of 18 streams have been investigated and 50 species identified. This preliminary list of stream bryophytes is presented in Table 1.

Mosses were more abundant than both liverworts and hornworts, with 26, 23 and one species identified respectively. Among the species identified, *Achrophyllum dentatum*, *Hypnodendron spininervium*, *Hypnodendron vitiense*, *Wijkia extenuata*, *Heteroscyphus coalitus*, *Heteroscyphus planiusculus* and *Riccardia aequicellularis* were most commonly represented. These species also are common in wet forest and rainforest on substrata such as soil, tree bases, rock and tree-ferns. *Achrophyllum dentatum* and *W. extenuata* are among the most common species in this habitat, and this is reflected in the streams. Species such as *Catagonium nitens*, *Fallaciella gracilis*, *Hypnodendron comosum*, *Mesochaete undulata*, *Pseudoleskiopsis imbricata*, *Geocalyx caledonicus* and *Lunularia cruciata* were least commonly represented, with examples being identified in only one or two streams. However, some of these species are common elsewhere; for example, *L. cruciata* is extremely common in areas that are disturbed or man-made, *P. imbricata* is fairly common on dry, exposed boulders and *Catagonium nitens* is a common terrestrial species in wet forest. *Hypnodendron comosum*, although not a rare species in rainforest, is much less abundant than either *H. vitiense* or *H. spininervium*. This, again, is reflected in streams, with *H. comosum* occurring in only one stream but *H. spininervium* and *H. vitiense* occurring in most streams. In the case of *G. caledonicus* and *F. gracilis* it is presumed that they are more common than thought (Scott and Stone 1976; Scott 1985; Meagher and Fuhrer 2003), but are seldom collected due to *G. caledonicus* bearing a strong resemblance to some *Chiloscyphus* species and *F. gracilis* having a rather nondescript appearance.

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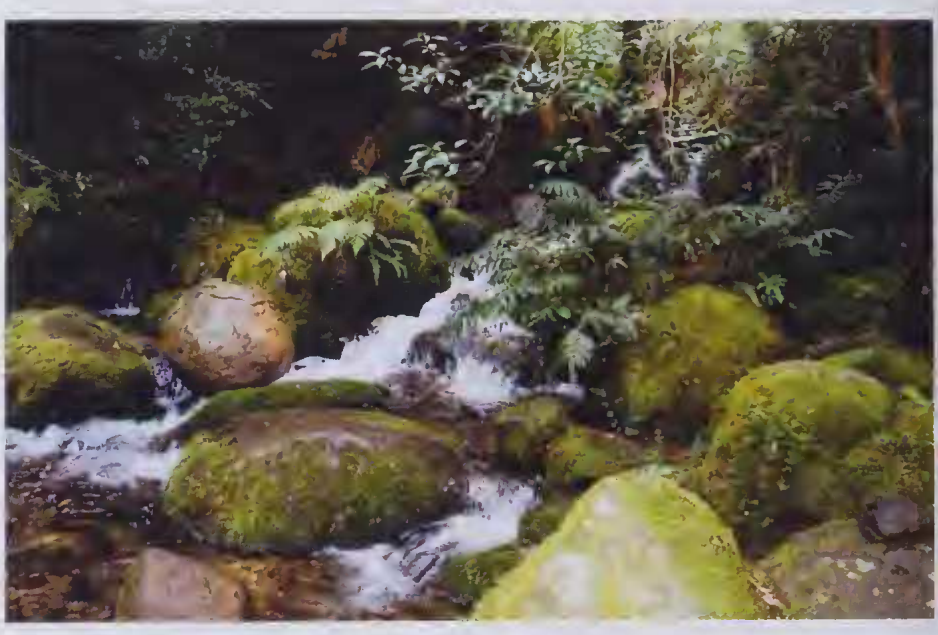

Fig. 1. Stream Bryophytes in a Victorian Cool Temperate Rainforest.

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References

Meagher D and Fuhrer B (2003) *A field guide to the mosses and allied plants of southern Australia.* Flora of Australia Supplementary Series Number 20. (Australian Biological Resources Study and The Field Naturalists Club of Victoria: Canberra)

Scott GAM (1985) *Southern Australian liverworts.* Australian Flora and Fauna Series Number 2. (Australian Government Publishing Service: Canberra)

Scott GAM and Stone I (1976) *The mosses of southern Australia.* (Academic Press: London)

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Fissidens oblongifolius is a moss with leaves that lie in one plane. Species of *Fissidens* are distinguished easily in the field as they have a 'hand-like' appearance. *Fissidens oblongifolius* is mentioned in the paper by Dell and Jenkins. Photograph by Matthew Dell.

Frullania falciloba is an epiphytic liverwort commonly found in the canopy of forests. Leaves occur in three rows. Leaves of the lateral rows consist of a lobe and smaller lobule. *Frullania* is one of the genera included in Meagher's key to leafy liverworts. Dell and Jenkins mention the species in their paper. Photograph by Matthew Dell.